

# Airship Flight Performance and Operations

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# A Pilot's Perspective



# Minimum requirements of the FAA for a Commercial Airship rating on a pilot's license,

at least 200 hours of flight time as a pilot, which includes at least the following hours:

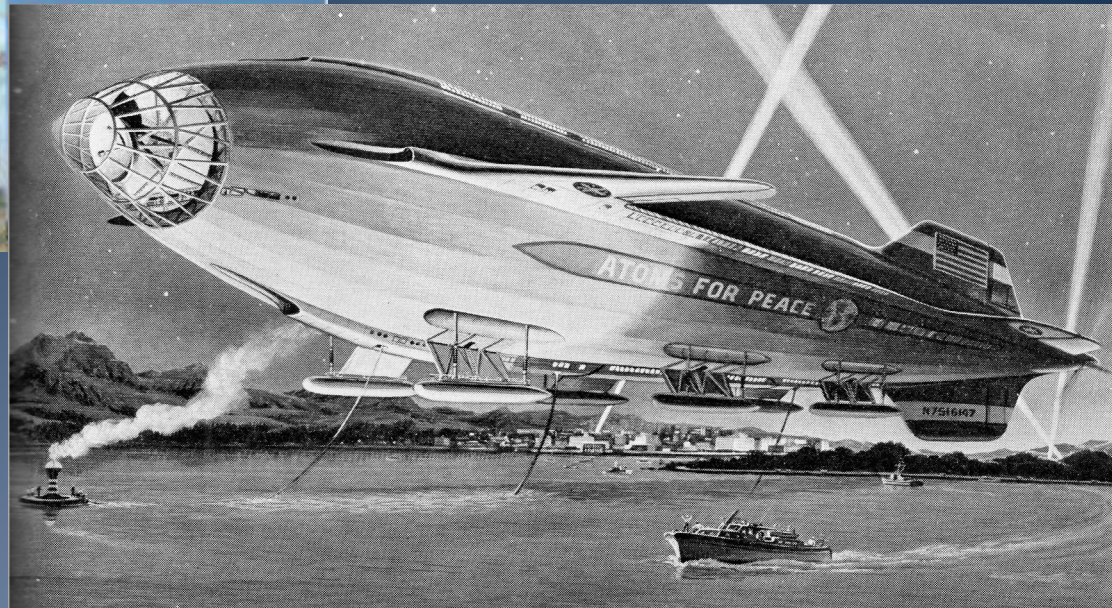
- (1) **50 hours in airships.**
- (2) Thirty hours of pilot in command flight time in airships or performing the duties of pilot in command in an airship with an authorized instructor aboard, which consists of—
  - (i) 10 hours of cross-country flight time in airships; and
  - (ii) 10 hours of night flight time in airships.





# 50 Hours

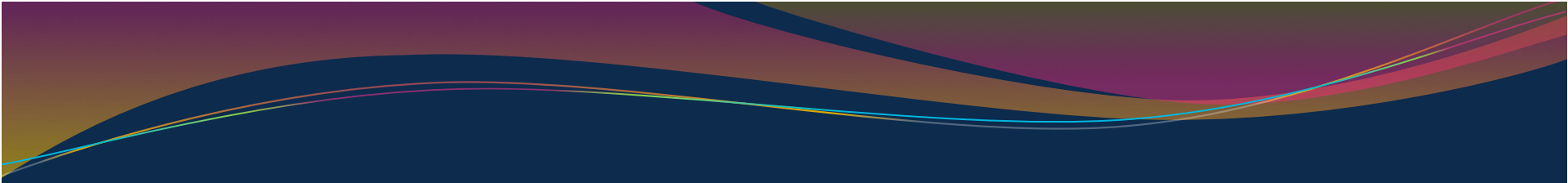
Does the pilot have the skills and degree of experience necessary before he is seasoned sufficiently to routinely serve as PIC for a large cargo airship?





# FAA Type Rating Required for Complex Airships



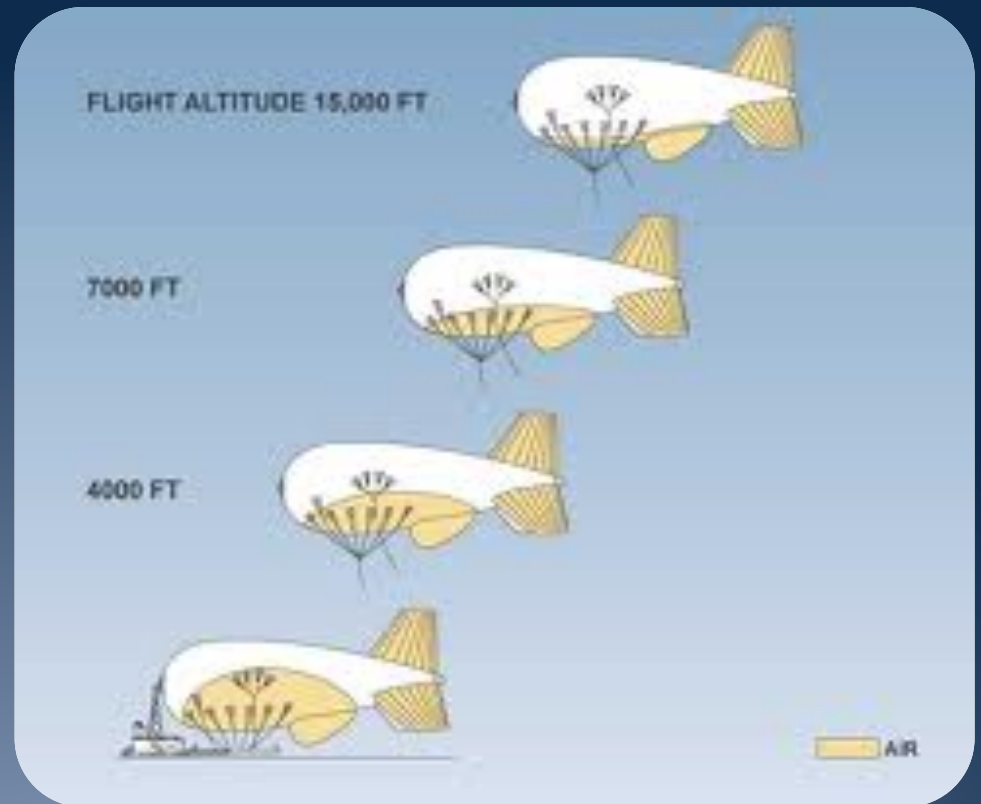


**What are the typical  
things an airship pilot  
must do to prepare for  
flight?**





# - Volume: Lift Height



# Payload:

- Cargo
- Crew
- Fuel/Fuel Burn

# Environment:

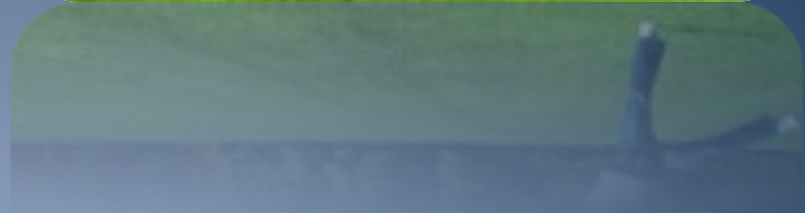
- Super-Heat
- “Weather Effect”



# Superheat Effects

Increased Lift

Decreased Height



# “Weather Effect”

Considered Before, During and After Flight



# Cold Weather - Snow

During the small party at the Japanese airship operations base in Nagoya yesterday evening, ZEPPELIN team members had to stay "dry". Said the Chief Pilot: "We cannot even have a beer, because we're expecting snow. And when it snows, we have to go out to the airship". Tanks with warm water are standing by to rid the airship of snow.



# Cold Weather – Flight Operations

Air Density Increases:

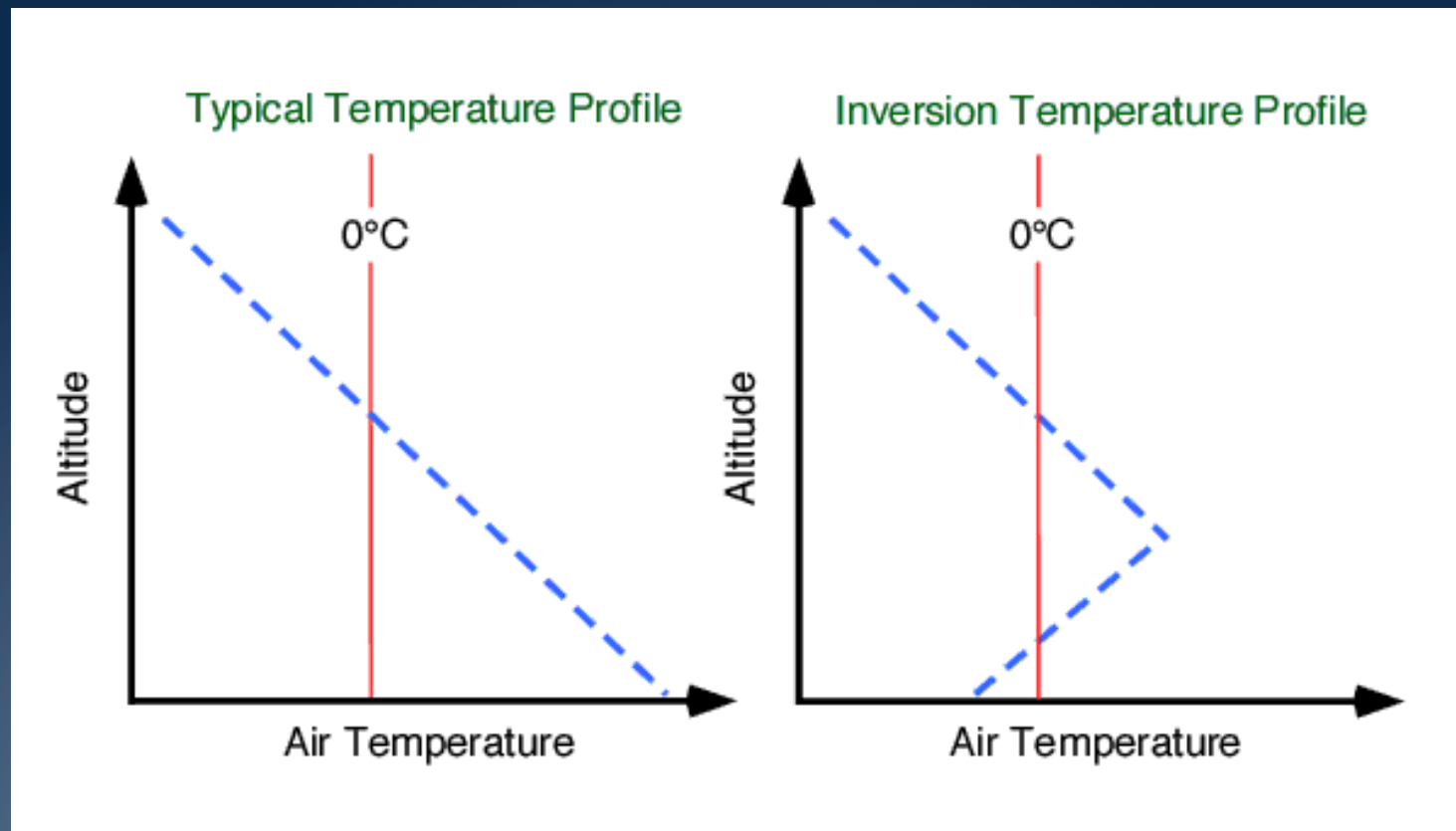
-Buoyancy Increase

Payload Increase

OR

Height Increase

# Temperature Inversions



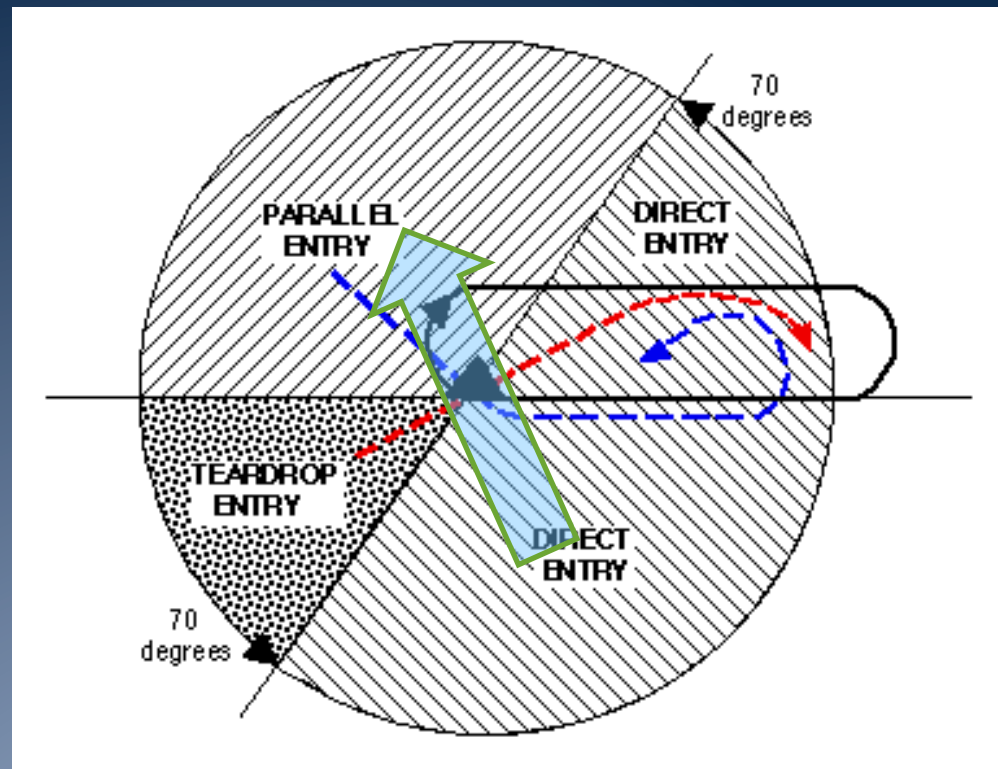
# Instrument Flying



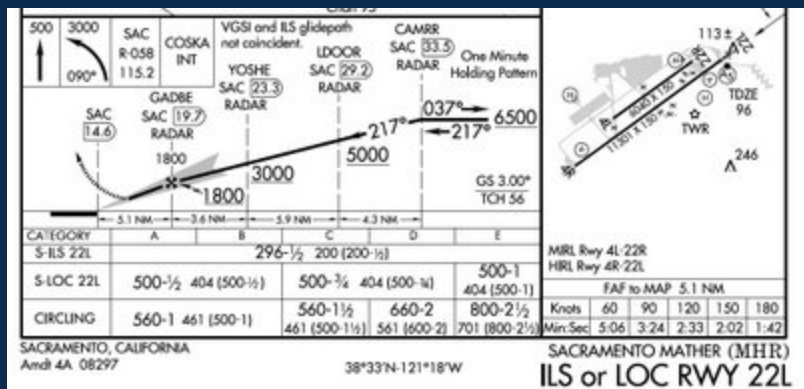


# Holding Patterns

-Very High Wind Correction Angles



# ILS Approaches





**Airships make  
instrument  
flying fun!**



# Turbulence





# “AVOID – AVOID Thunderstorms”





# What's turbulence like in an airship ?







What about  
turbulence during  
take-off?

d



A dramatic landscape painting featuring a vast, golden-brown field in the foreground, leading up to a range of dark, silhouetted mountains. The sky is filled with heavy, dark, and swirling clouds, with patches of vibrant orange and red light breaking through, suggesting a sunset or sunrise during a storm. The overall mood is intense and atmospheric.

Don't take-off

d





What about  
turbulence during  
landing?

d



The background is a dramatic landscape painting. The sky is filled with dark, swirling clouds in shades of purple, blue, and grey, with bright orange and yellow light breaking through on the left side, suggesting a sunset or sunrise. Below the sky is a range of dark, silhouetted mountains. The foreground is a vast, flat field of golden-brown grass or wheat, illuminated by the warm light from the sky.

**Proper  
Planning  
Prevents  
Poor  
Performance**





- Choose your pilots carefully

- Trust their judgment

- Call Dr. Sarma





Is airship  
piloting  
particularly  
fatiguing?





# Depends...



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# Depends...





# Mechanical





# Fly-By-Wire/Light





# Rest on Long Duration Flights?

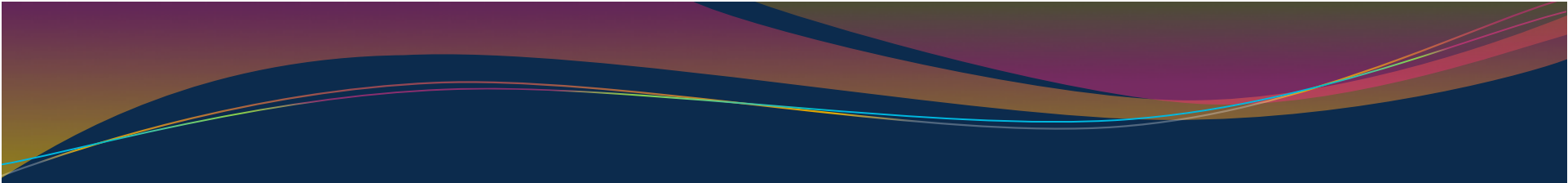


# 50 hour unrefueled endurance flight

- September 8 – 10, 1990
- Skyship 600 and four pilots
- Set the record for a non-rigid airship
- Flight conducted in conjunction with 1990 Farnborough Air Show







If you could design your own large cargo airship, what features or capabilities would you most wish to see in that ship, from a pilot's perspective?

# Low speed height control






# Low speed pitch & yaw control



# Mechanized Mooring System





# **Rapid & Reliable Ballast Transfer System**



# Accurate Current and Forecast Weather Information





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